Remarks

This is in response to the Office Action dated September 2, 2004. The Office Action rejected claims 1-26 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,633,258 (Lindenmeier et al.). Claims 1-26 were also rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0058488 (Miyahara).

Applicants have amended claims 1, 10 and 18 to more particularly point out and distinctly claim the invention. Claims 1-26 remain for consideration.

The present invention is directed to multipath mitigation in a satellite navigation receiver. In accordance with an embodiment of the invention, an antenna array made up of a plurality of antennas is used to receive satellite signals from a plurality of satellites. A switch connects each of the antenna outputs to a single signal processing path and sequentially and cyclically connects an output of each of the antennas to the single signal processing path thereby generating a common additive signal. The common additive signal has components associated with each of the antennas. This common additive signal is then provided to each of a plurality of satellite channel processors for processing.

At a superficial level, the above described embodiment of the invention may seem similar to the two cited references. However, there are significant differences between the present invention and the cited references as will be discussed herein.

Both Lindenmeier et al. and Miyahara use multiple antennas independently for signal processing. That is, they both select one of the multiple antennas based on some criteria, and use the signal from that one antenna for further processing. For example, see Lindenmeier et al. at col. 8, lines 34-42 where that reference describes that after the signals are tested the "most favorable" reception signal is used by the receiver. See also, col. 2, lines 16-20 ("selection of a more favorable received signal"); col. 6, lines 19-30 (after testing "the most favorable reception signal" is selected). Thus, in accordance with the technique of Lindenmeier et al., the antennas are sequentially evaluated to determine the reception level (see col. 9, lines 20-26), and a favorable signal is chosen for receipt of a signal for signal processing.

Miyahara is similar in that, as described in paragraph [0006], it makes use of a detector to determine the reception signal level of multiple antennas in order to choose one of the antennas for receipt of a signal for signal processing. The steps of the Miyahara technique as described in connection with Fig. 2 of Miyahara further describe how that technique tests the various antennas and then sets one of the antennas as the receiving antenna (see, e.g., Fig. 2 steps S106, S110, S116, S120).

The present invention, as set forth in claim 1, generates "a common additive signal", which as described in the specification at paragraph [0018] has components associated with each of the antennas, and provides the common additive signal to the satellite channel processors for further processing. The common additive signal is generated by "sequentially and cyclically switching an output of each of said plurality of antennas to a single signal processing path". These limitations clearly distinguish claim 1 over the cited references.

While Lindenmeier et al. and Miyahara both disclose aspects of sequential testing, they both use sequential testing in their process for selecting an antenna to use for signal processing. This is seen in Lindenmeier et al. at col. 9, lines 19-27 where that reference describes the testing procedure in which the individual antennas are successively switched in order to determine a reception level. This is seen in Miyahara at paragraph [0026] where that reference describes the testing of the various antennas upon device activation in order to determine the reception levels of the signals received from the various antennas. However, in both Lindenmeier et al. and Miyahara, sequential switching is used in order to select a single antenna to use for signal processing. Thus, there is no disclosure in either Lindenmeier et al. or Miyahara of the claimed limitations of "switching an output of each of said plurality of antennas to a single signal processing path to generate a common additive signal" and "providing said common additive signal to each of a plurality of satellite channel processors" for processing.

Further, claim 1 has been amended to add the term "cyclically" to the switching step in order to more particularly claim that the sequential process of switching the antenna outputs to the single signal processing path is repeated cyclically. This further distinguishes claim 1 over the cited art because there is no disclosure in the cited art of sequentially switching among the plurality of antennas in a repeating cycle in order to

generate a common additive signal which contains components associated with each of the antennas.

For the reasons discussed above, claim 1 is allowable over Lindenmeier et al. and Miyahara under both §102 and §103.

Independent claims 10 and 18 have been amended in a manner similar to that of claim 1 and are allowable for the same reasons as discussed above in connection with claim 1.

For the above reasons, independent claims 1, 10 and 18 are allowable over the cited art. All remaining claims are dependent upon an allowable independent claim, and are therefore also allowable. Further, the dependent claims add additional allowable subject matter as follows:

- Claims 3, 12, 13 and 20 are directed to various aspects of the generation of phase shift correction signals and the synchronous application of the phase shift correction signals to a carrier phase reference signal.
- Claims 4, 14 and 21 are all directed to embodiments in which the antennas are implemented as a horizontal antenna array and wherein the phase shift correction signals are calculated according to a particular equation.
- Claims 5, 15 and 22 are all directed to embodiments in which the antennas are implemented as a vertical antenna array and wherein the phase shift correction signals are calculated according to a particular equation.
- Claims 8, 9, 16, 17, 25 and 26 are all directed to various embodiments relating to the application of blocking signals to the satellite channel processors to block the processing of signals from unwanted satellites.
- Claims 2, 6, 7, 11, 19, 23 and 24 are all directed to various embodiments relating to tracking a carrier phase of a satellite signal using a reference signal and tracking a pseudo-random code of a satellite signal using a delay locked loop circuit.

Applicants assert the neither Lindenmeier et al. nor Miyahara render the above identified independent claims anticipated or obvious.

Moreover, the Office Action does not address any of the above claim limitations and provides absolutely no basis for rejecting these claims. As such the Office Action has failed to make a prima facie showing of anticipation or obviousness and therefore applicants request the withdrawal of the rejection and allowance of these claims. If the Examiner persists in the rejection of these claims, Applicants request that the Examiner specifically address each of the limitations of these claims and that the Examiner cite specific portions of the cited references in connection with these limitations so that Applicants may fully evaluate and respond to these rejections.

The amendments to the claims adding the term "cyclically" is supported by the specification as filed at least at paragraph [0033].

For the reasons discussed above, all pending claims are allowable over the cited art. Reconsideration and allowance of all claims is respectfully requested.

Respectfully submitted,

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